# DS-LAK24

## Third workshop on Data Storytelling and Learning Analytics Dashboards

MONASH University

COLAM
Centre for Learning Analytics Monash

# Organisers

**Gloria Milena Fernandez-Nieto**

Monash University, Australia

**Vanessa Echeverria**

Monash University, Australia

**Roberto Martinez-Maldonado**

Monash University, Australia

**Yi-shan Tsai**

Monash University, Australia

**Lu Lawrence**

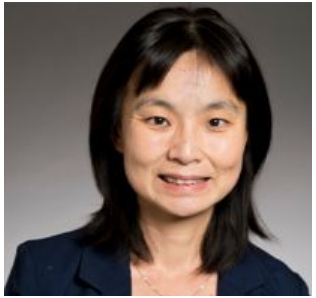
Utah State University, USA

**Shaveen Singh**

Monash University, Australia

**Stanislav Pozdniakov**

The University of Queensland, Australia



**Lujie Karen Chen**

University of Maryland Baltimore County, USA

**Jiaqi Gong**

The University of Alabama, USA

**Louise Yarnall**

SRI Education, USA

COLAM

# Agenda

| Time | Duration | Activity | Responsible |
|---|---|---|---|
| 1:30 - 1:45 PM | 15 min | Introduction | All |
| 1:45 - 2:15 PM | 30 min | Welcome and contextualisation of existing work on DS | Organisers |
| 2:15 - 3:00 PM | 45 min | Methods and Methodologies for DS in LA Dashboards.<br>5 min presentation + 5 min for questions | Participants |
| 3:00 - 3:30 PM | 30 min | Coffee break | |
| 3:30 - 3:45 PM | 15 min | Methods and Methodologies for DS in LA Dashboards.<br>5 min presentation + 5 min for questions | Participants |
| 3:45 - 4:45 PM | 1 hour | Follow up discussion | All |
| 4:45 - 5:00 PM | 15 min | Wrap up | All |

COLAM

# Introductions

15 minutes

MONASH University | COLAM Centre for Learning Analytics Monash

# Introductions

## A. Introduce yourself (name, country, and university)

B. Slido: What do you want to learn from this workshop?

**Options to access the Slido poll**:

- Go to https://slido.com enter this code: 3604266
- Visit: https://shorturl.at/hqwPY
- Or scan de QR code

COLAM

# Data Storytelling and Learning Analytics Dashboards - A brief introduction

30 minutes

MONASH University | COLAM

Centre for Learning Analytics Monash

# Agenda

- Motivation and foundations
- Previous and current LA work

COLAM

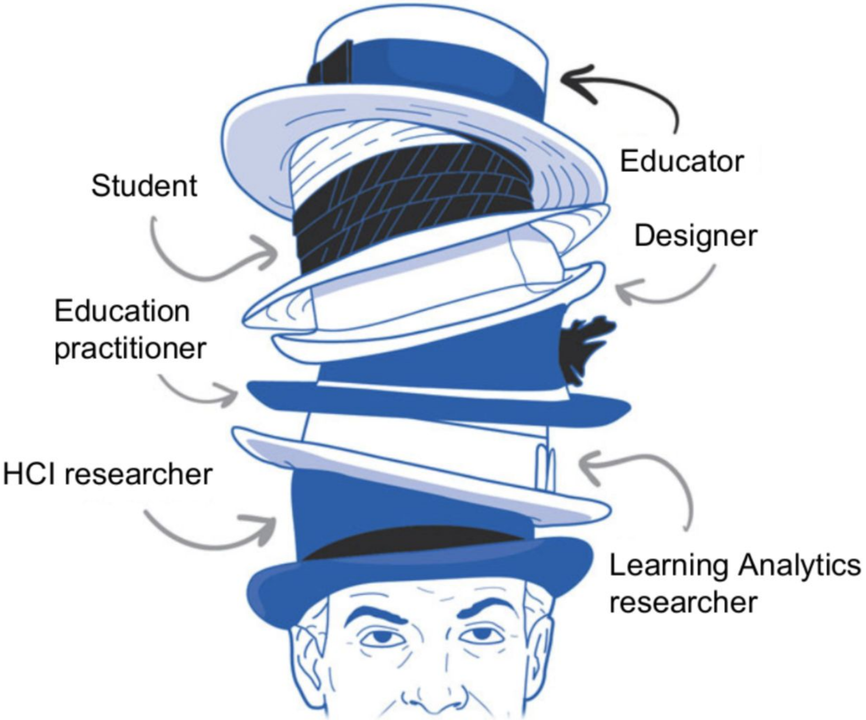
# Motivations and foundations

COLAM

# Motivations and foundations

Data Storytelling sits at the intersection of various areas of expertise (InfoVis, HCI, design, storytelling, psychology)

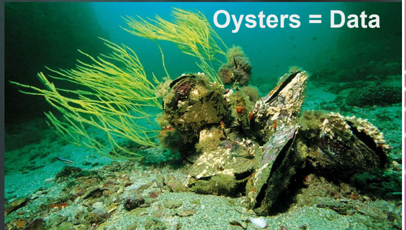
… we will be wearing multiple hats.



# Motivations and foundations

"we are drowning in ~~information~~ [data], but we are starved for **knowledge**".

John Naisbitt , 1982



# Motivations and foundations

= INSIGHT

COLAM

# Motivations and foundations

WHAT IS

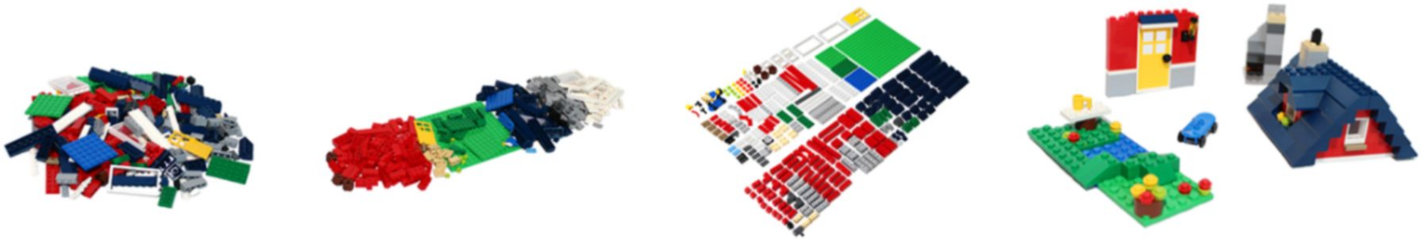
An information **compression** technique for communicating **insights** to an audience through the combination of **data**, **visuals**, and **narrative.**


COLAM

Brent Dykes. 2015. Data storytelling: What it is and how it can be used to effectively communicate analysis results. Applied Marketing Analytics. 1, 4, 299-313.

# Motivations and foundations

1. Data Collection
2. Data Preparation
3. Data Visualization
4. Data Analysis



5. Data Storytelling

*“The journey of going from raw data to a data story is a **process**. Successful data storytelling doesn’t begin at step five—it begins right at the beginning with the data you collect”*

**Brent Dykes** https://www.effectivedatastorytelling.com/post/a-deeper-dive-into-lego-bricks-and-data-stories

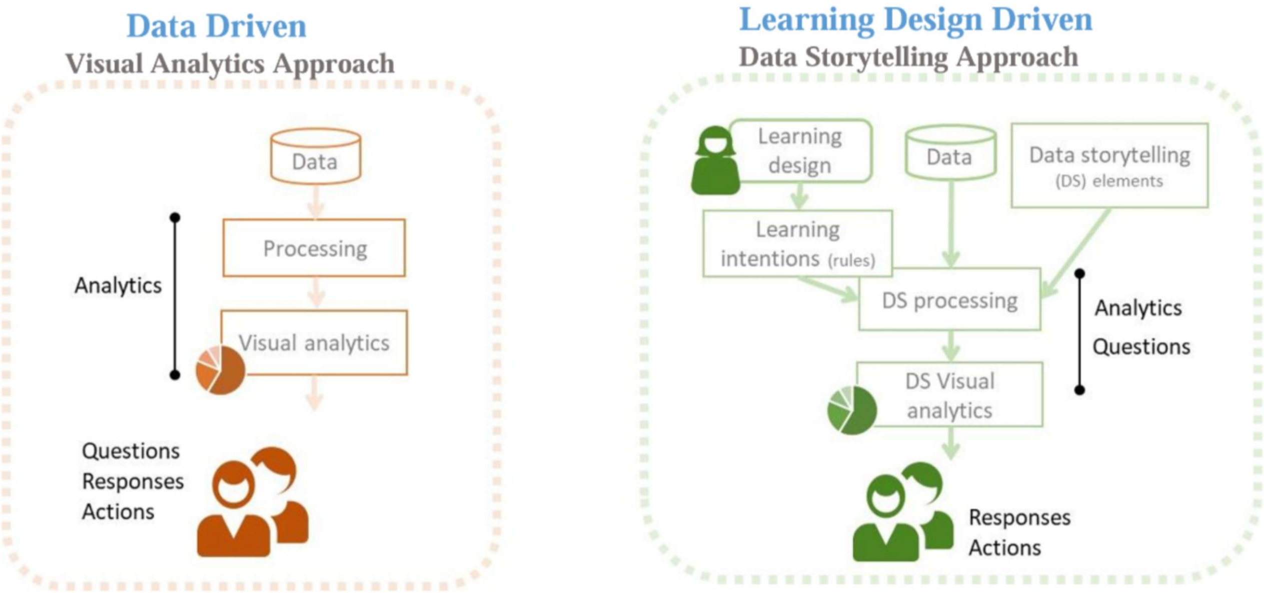
# Previous and current DS-LA work

Data Storytelling **to communicate insights** (Info Visualisation)

CoLAM

# Previous and current DS-LA work

Dr Vanessa Echeverria

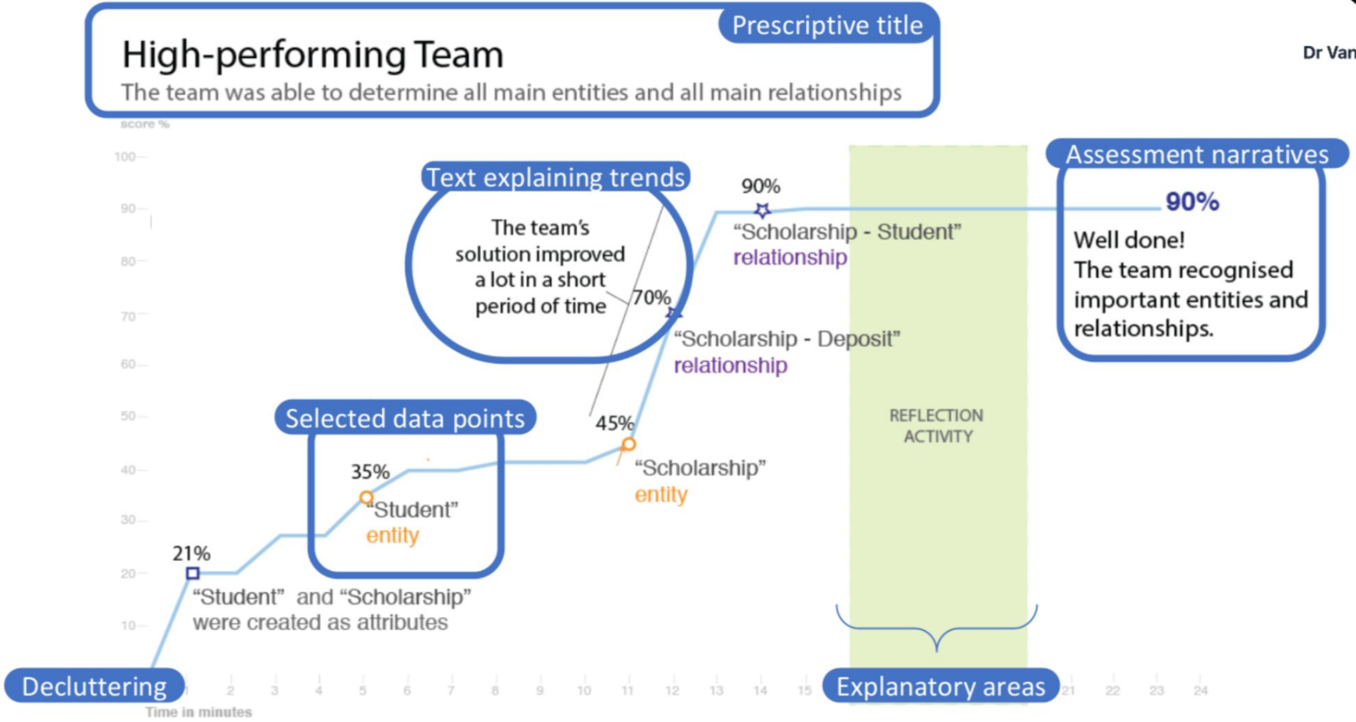



COLAM

Echeverria, Martinez-Maldonado, Buckingham Shum, Chiluiza, Granda, and Conati. (2018) "**Exploratory versus explanatory visual learning analytics: Driving teachers' attention through educational data storytelling.**" Journal of Learning Analytics.

# Previous and current DS-LA work

Dr Vanessa Echeverria

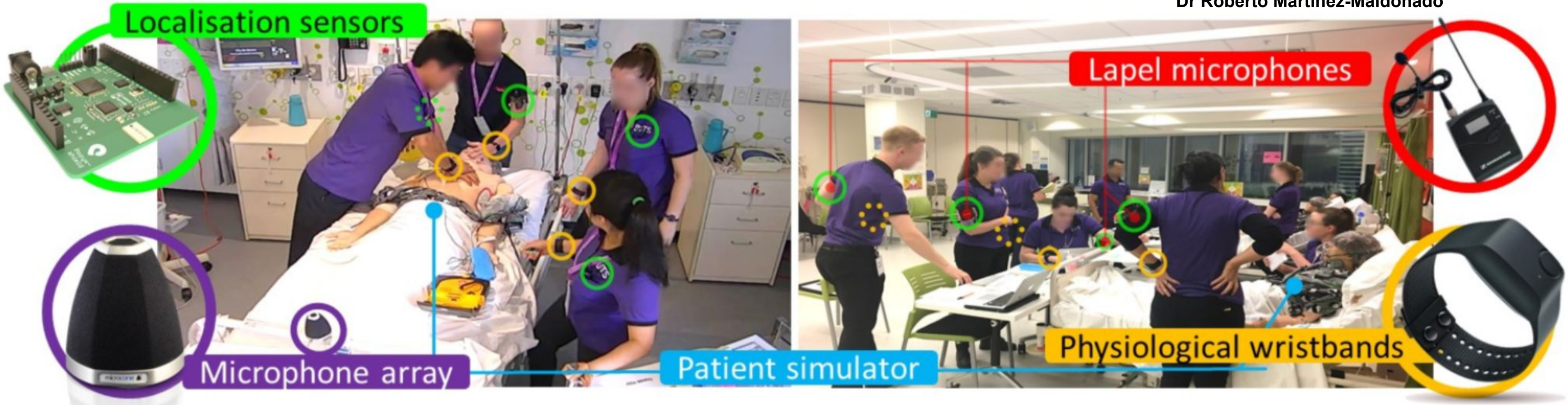




Echeverria, Martinez-Maldonado, Buckingham Shum, Chiluiza, Granda, and Conati. (2018) "**Exploratory versus explanatory visual learning analytics: Driving teachers' attention through educational data storytelling.**" Journal of Learning Analytics.

# Previous and current DS-LA work

Dr Roberto Martinez-Maldonado



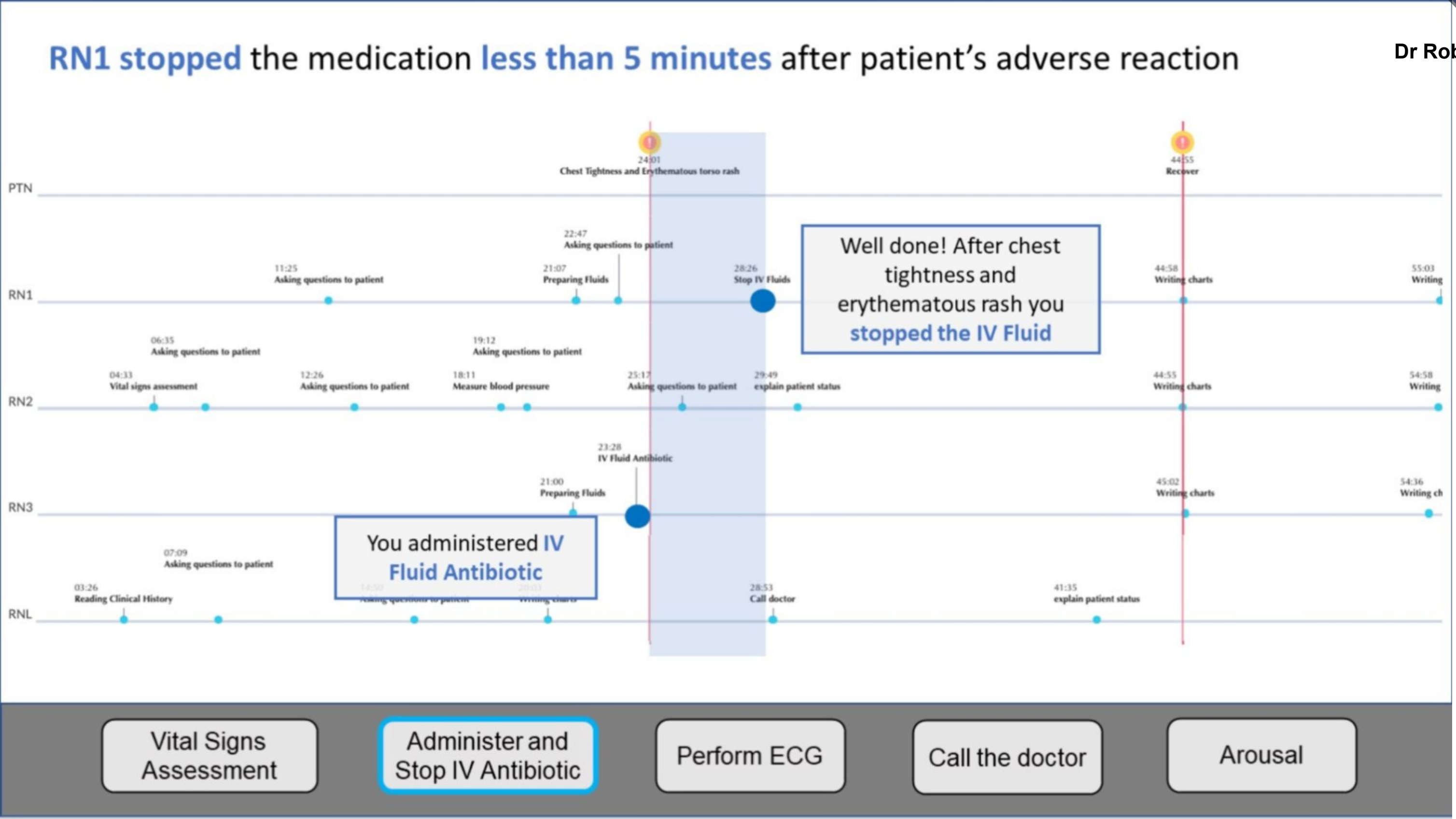

“The goal of MMLA is to support learning experiences that may be collaborative, hands-on, and face-to-face, de-emphasizing the computer screen as the primary form or object of interaction”

Worsley et al. 2021

COLAM

# Previous and current DS-LA work

Dr Roberto Martinez-Maldonado

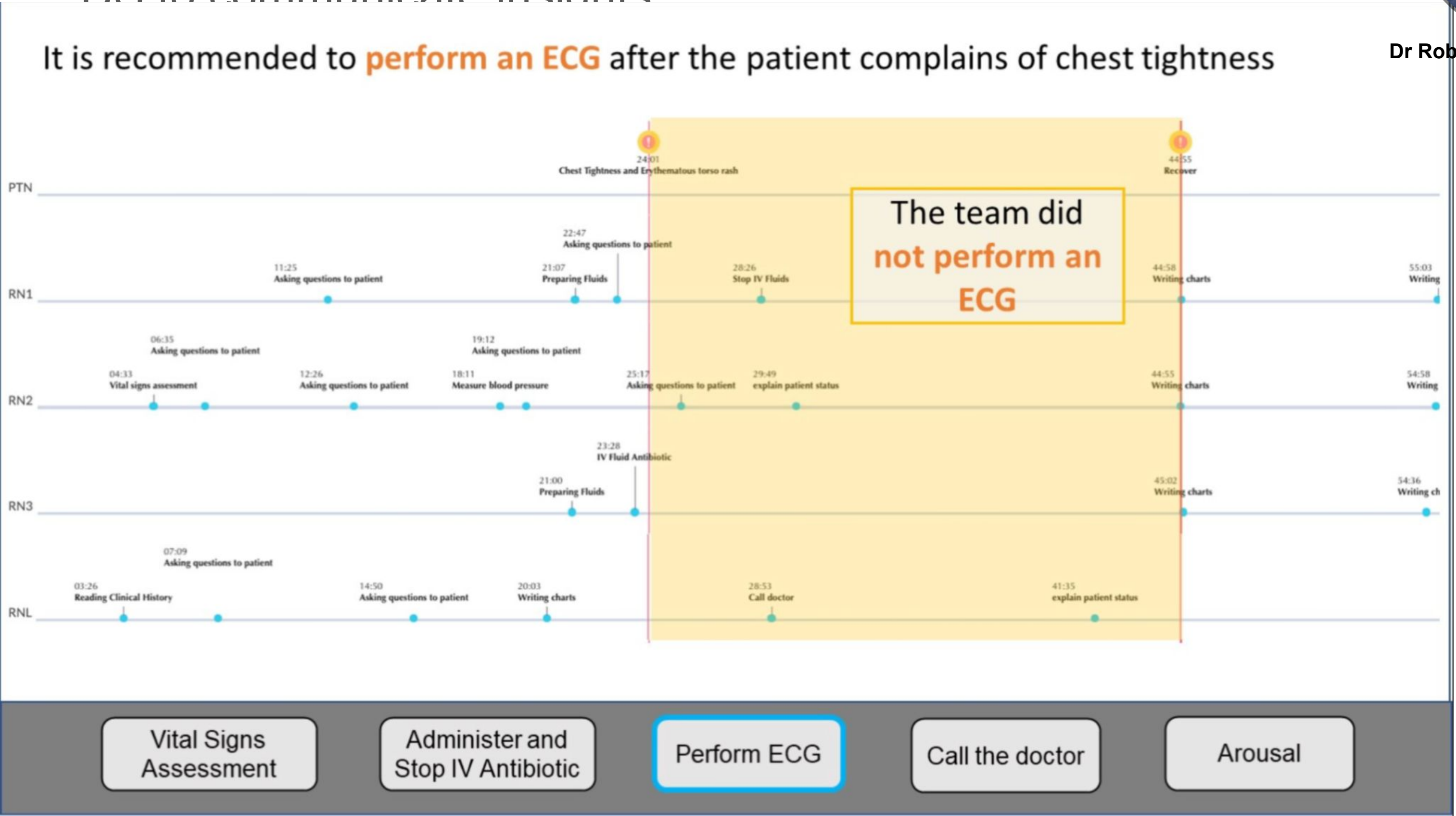



Martinez-Maldonado & Echeverria, & Fernandez-Nieto & Buckingham Shum (2020). **From Data to Insights: A Layered Storytelling Approach for Multimodal Learning Analytics.** 1-15. 10.1145/3313831.3376148

# Previous and current DS-LA work

DS to communicate insights

Dr Roberto Martinez-Maldonado



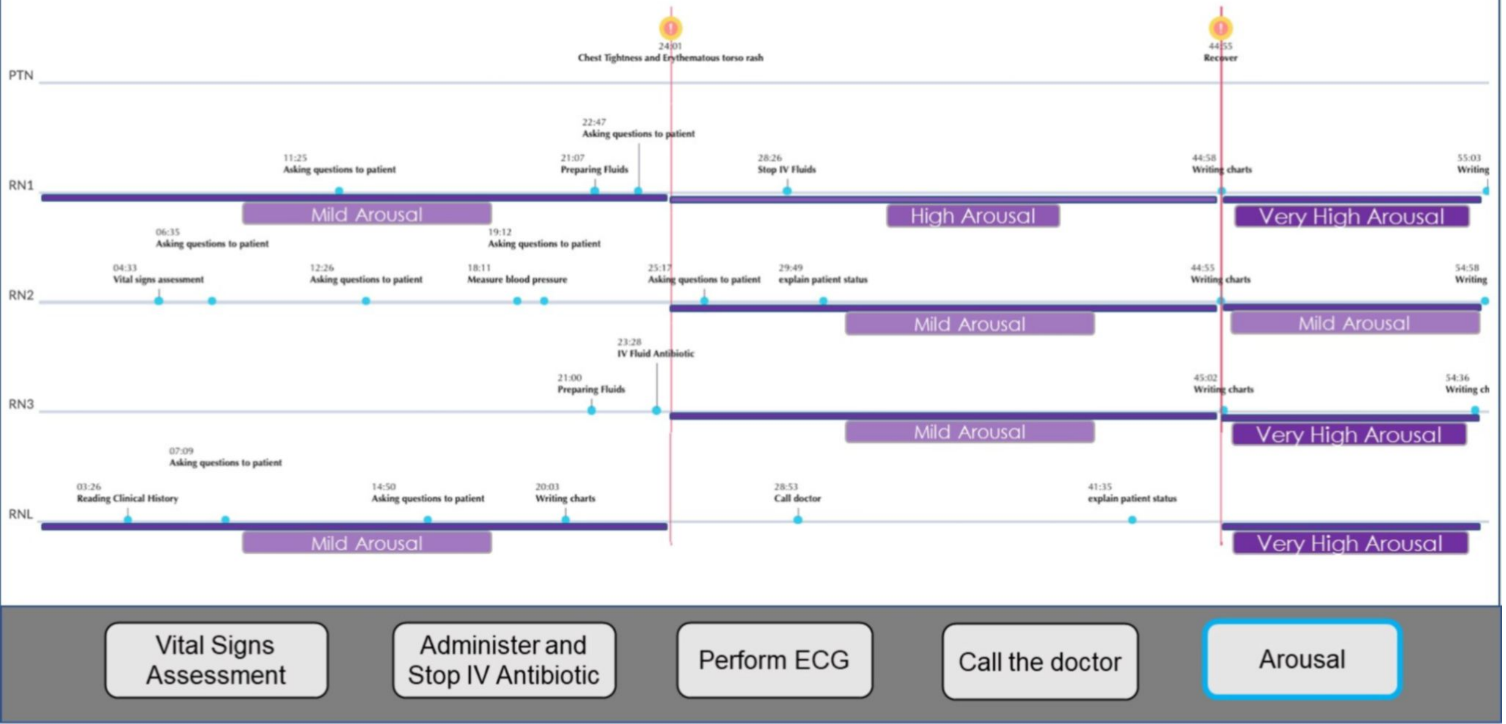


Martinez-Maldonado & Echeverria, & Fernandez-Nieto & Buckingham Shum (2020). **From Data to Insights: A Layered Storytelling Approach for Multimodal Learning Analytics.** 1-15. 10.1145/3313831.3376148

# Previous and current DS-LA work

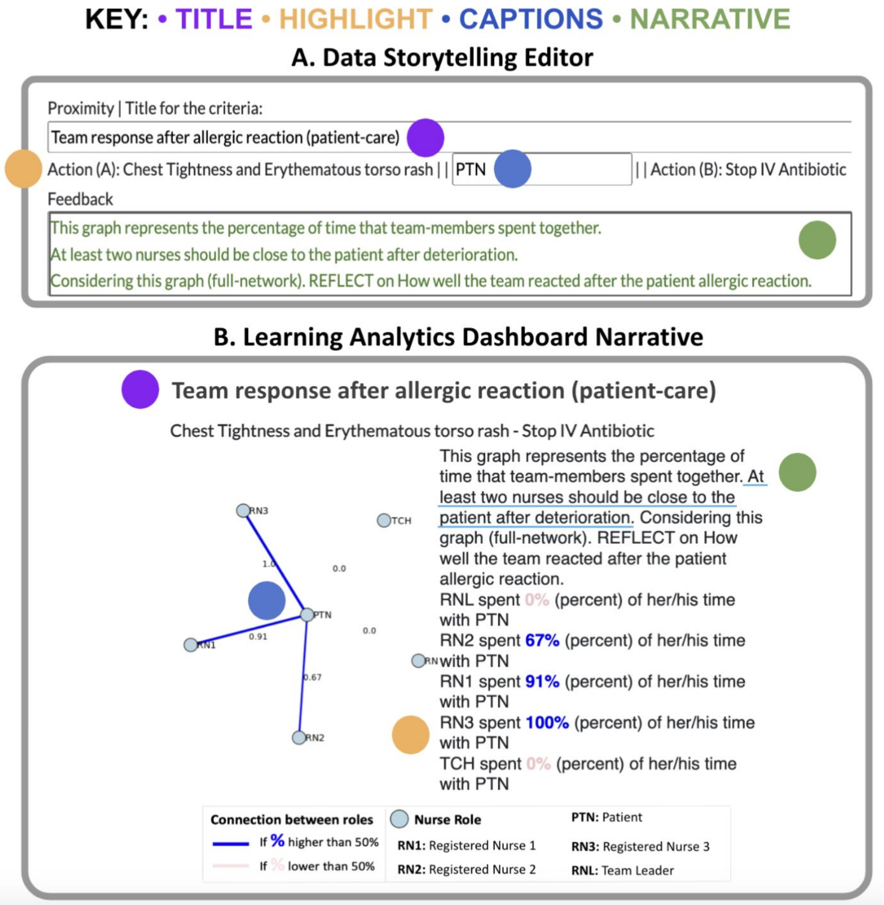
Dr Roberto Martinez-Maldonado

RN1, RN3 and RNL presented several arousal peaks throughout the simulation
RN2 presented a few arousal peaks




Martinez-Maldonado & Echeverria, & Fernandez-Nieto & Buckingham Shum (2020). **From Data to Insights: A Layered Storytelling Approach for Multimodal Learning Analytics.** 1-15. 10.1145/3313831.3376148

# Previous and current DS-LA work



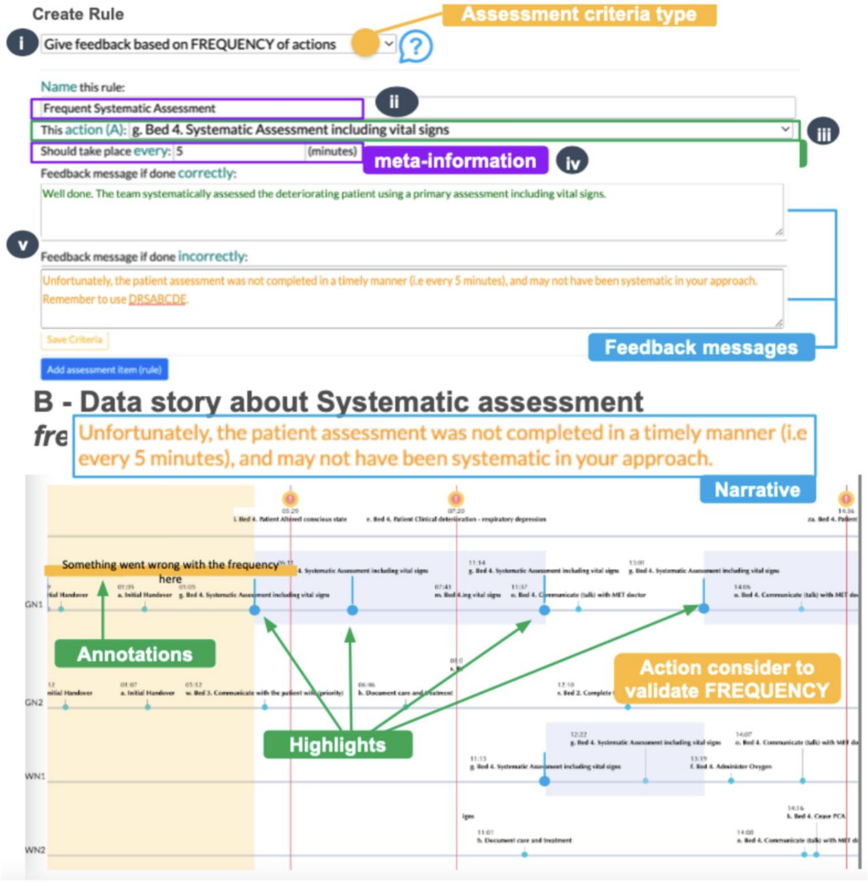


Dr Gloria Milena Fernández-Nieto

Fernandez-Nieto, Martinez-Maldonado, Echeverria, Kitto, Gašević, and Buckingham Shum. 2024. **Data Storytelling Editor: A Teacher-Centred Tool for Customising Learning Analytics Dashboard Narratives.** In LAK '24, March 18–22, 2024, Kyoto, Japan. ACM, New York, NY, USA, 16 pages

COLAM

# Previous and current DS-LA work




Dr Gloria Milena Fernández-Nieto

Fernandez-Nieto, Martinez-Maldonado, Echeverria, Kitto, Gašević, and Buckingham Shum. 2024. **Data Storytelling Editor: A Teacher-Centred Tool for Customising Learning Analytics Dashboard Narratives.** In LAK '24, March 18–22, 2024, Kyoto, Japan. ACM, New York, NY, USA, 16 pages

COLAM

# Previous and current DS-LA work

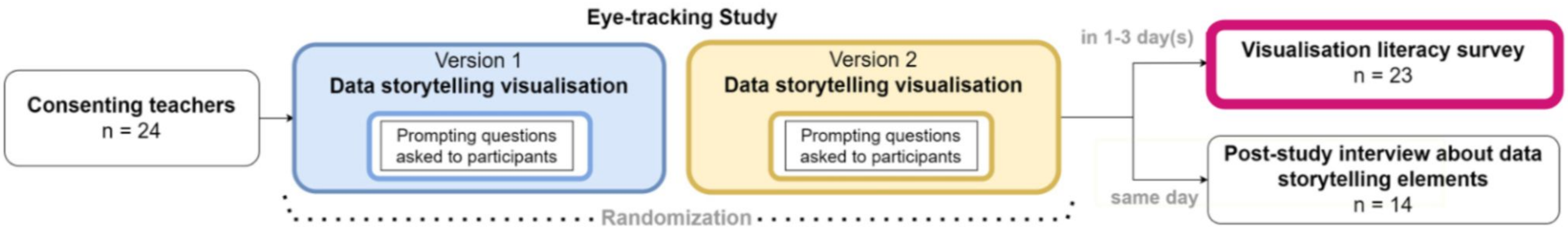

Dr Stanislav Pozdniakov

Pozdniakov,Martinez-Maldonado, Tsai, Echeverria, Srivastava, and Gasevic. 2023. **How Do Teachers Use Dashboards Enhanced with Data Storytelling Elements According to their Data Visualisation Literacy Skills?**. In LAK23, March 13–17, 2023, Arlington, TX, USA. ACM, New York, NY, USA,

COLAM

# Previous and current DS-LA work

Dr Stanislav Pozdniakov




Results suggest that **high VL teachers**
- adopted **complex exploratory strategies** and
- were more **sensitive to subtle inconsistencies in the design**;

while **low VL teachers**
- **benefited the most** from more explicit data storytelling guidance
- such as accompanying complex graphs with **narrative** and semantic **colour encoding**

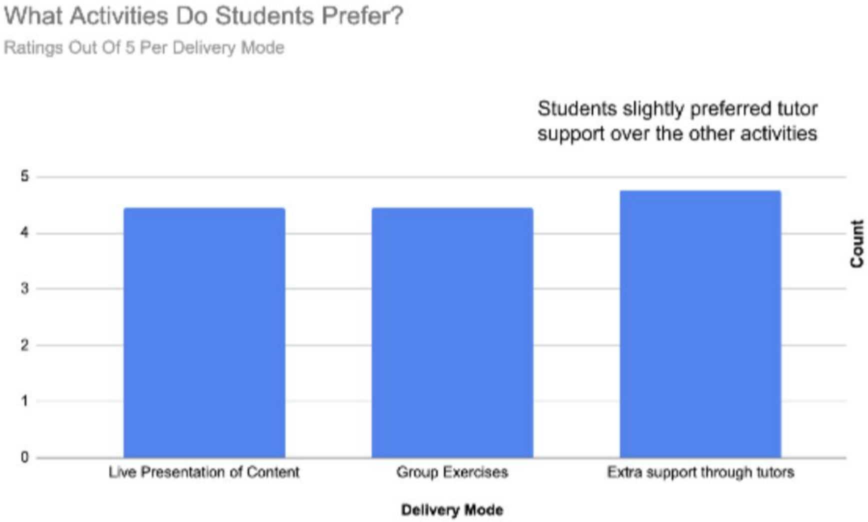
COLAM

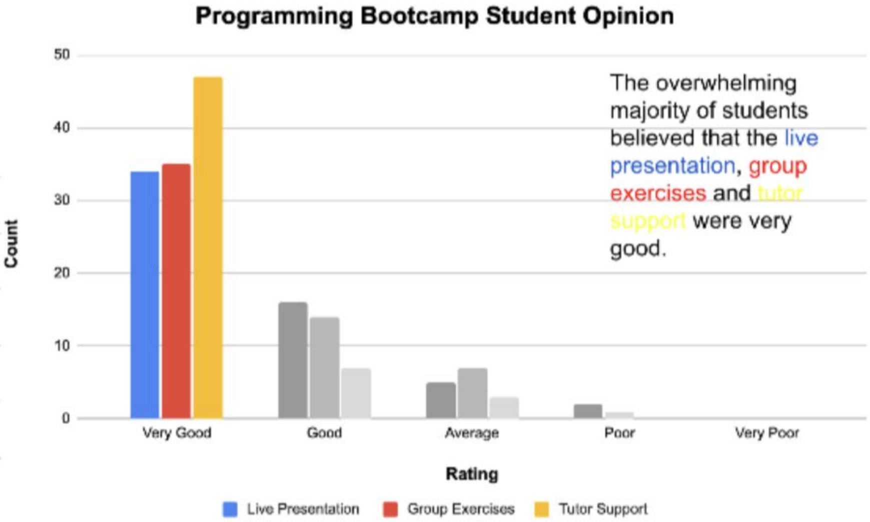
Pozdniakov,Martinez-Maldonado, Tsai, Echeverria, Srivastava, and Gasevic. 2023. **How Do Teachers Use Dashboards Enhanced with Data Storytelling Elements According to their Data Visualisation Literacy Skills?**. In LAK23, March 13–17, 2023, Arlington, TX, USA. ACM, New York, NY, USA,

# Previous and current DS-LA work

Mikaela Milesi

Data Storytelling **prototypes designed by teachers** to study the role of the **data story designer**……and **potential risks and ethical dilemmas**




COLAM

Milesi and Martinez-Maldonado. 2024. **Data Storytelling in Learning Analytics? A Qualitative Investigation into Educators' Perceptions of Benefits and Risks.** Submitted to LAK'24.

# Previous and current DS-LA work

Mikaela Milesi

INCIDENTAL RISKS

“it's easy to potentially tell the wrong story or tell a story that is **deviating from something else** that could have been a bigger and truer story”

ETHICAL OBLIGATIONS

Data storytelling features could be “**maliciously [to] hide certain data** or insights from people if they are less flattering”

if designers have “certain personal goals [for] the program … it's important that they **put that bias aside** and work with a team of different stakeholders in terms of picking which stories to present”

EXPERTISE REQUIRED BY THE DESIGNER

“there is a risk of the storyteller **missing [insights] … if they are focusing on a specific story**”

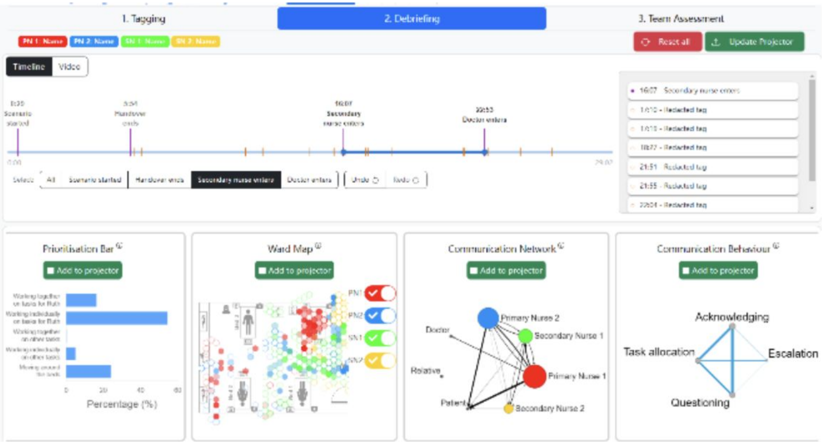
MANIPULATIVE POTENTIAL

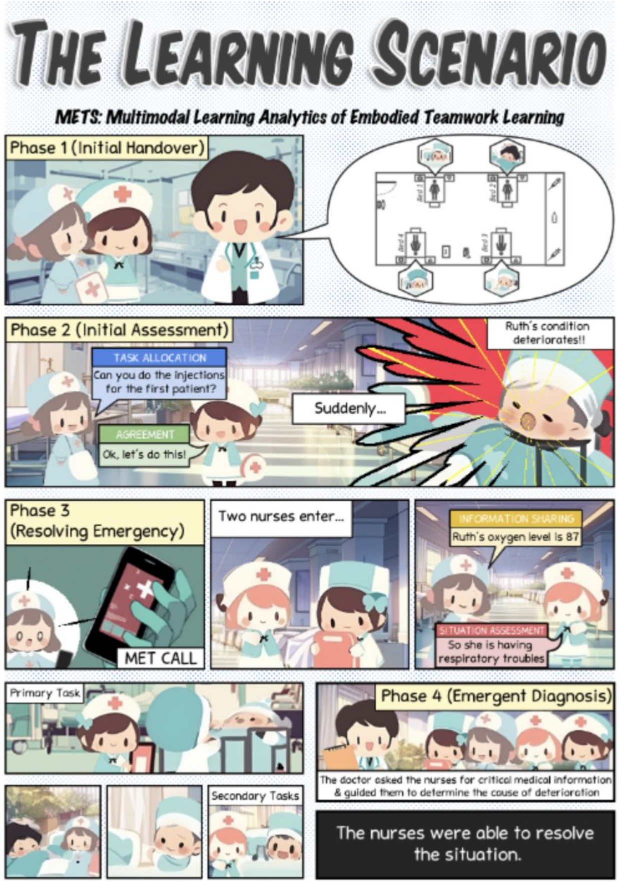
“**if my intention right now is to convince somebody that I'm doing a really good job as [a lead educator], [data storytelling] is all I need**”

COLAM

Milesi and Martinez-Maldonado. 2024. **Data Storytelling in Learning Analytics? A Qualitative Investigation into Educators' Perceptions of Benefits and Risks.** Submitted to LAK’24.

# Previous and current DS-LA work




Mikaela Milesi

GenAI-enhanced data comic prototypes created using a combination of the GenAI tool, **Midjourney**, and **graphics illustration software**.

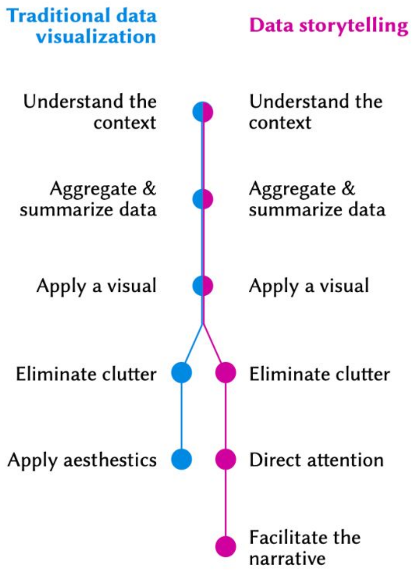
COLAM

# Previous and current DS-LA work

**Non LA** Data Storytelling work

COLAM

# Previous and current DS-LA work




(a) Principles of DV and DS

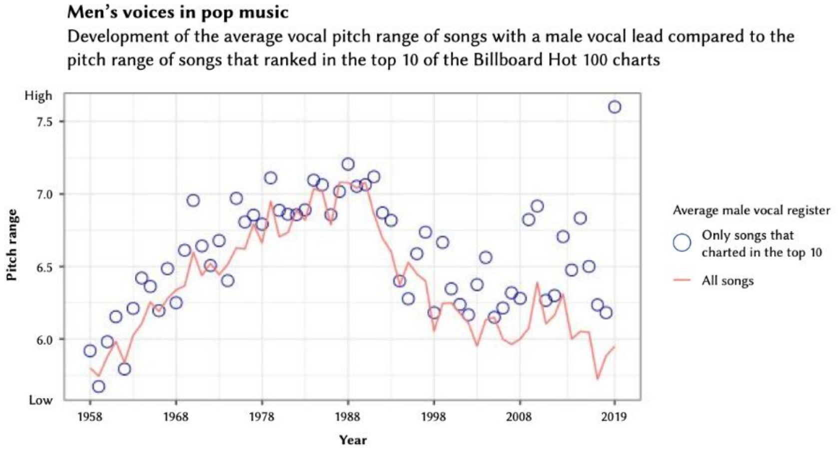
| Phases | Principles | Concrete actions |
|---|---|---|
| Explore the data | **Understand the context**<br>Define the audience and the purpose of the visualisation | – Brainstorm & research<br>– Find data |
| | **Aggregate & summarize data**<br>Define the main data points to deliver the purpose | – Clean data<br>– Manipulate data if applicable |
| Craft the visualization | **Apply a visual**<br>Translate data into a visualisation | – Select an appropriate graph type |
| | **Eliminate clutter**<br>Reduce the cognitive load | – Apply Gestalt principles<br>– Remove data labels, data markers, grid, legend, tick marks, axis label |
| | **Direct attention**<br>Ensure visual guidance for the user | – Remove unnecessary data and push necessary, but non-focal data to the background<br>– Choose preattentive attributes for focal data points e.g. orientation, shape, size, line length, hue, intensity, curvature |
| Tell the story | **Facilitate the narrative**<br>Deliver the message | – Apply narrative text labels to focal data points<br>– Ordering & Interactivity<br>– Clear title delivering the main insight or outcome |

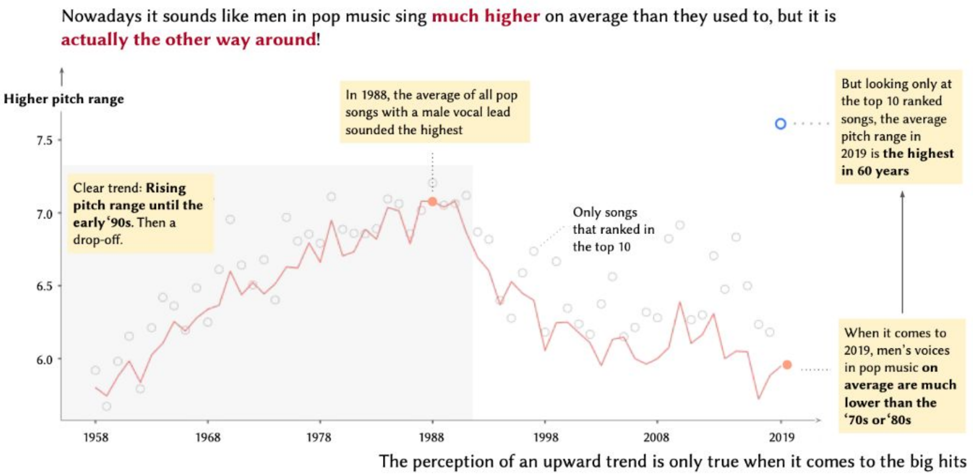
(b) Data storytelling framework

COLAM

Dominyk Zdanovic, Tanja Julie Lembcke, and Toine Bogers. 2022. **The Influence of Data Storytelling on the Ability to Recall Information.** In Proceedings of the 2022 ACM SIGIR Conference on Human Information Interaction and Retrieval (CHIIR ’22), March 14–18, 2022, Regensburg, Germany. ACM, New York, NY, USA, 11 pages. https://doi.org/10.1145/3498366.3505755

# Previous and current DS-LA work



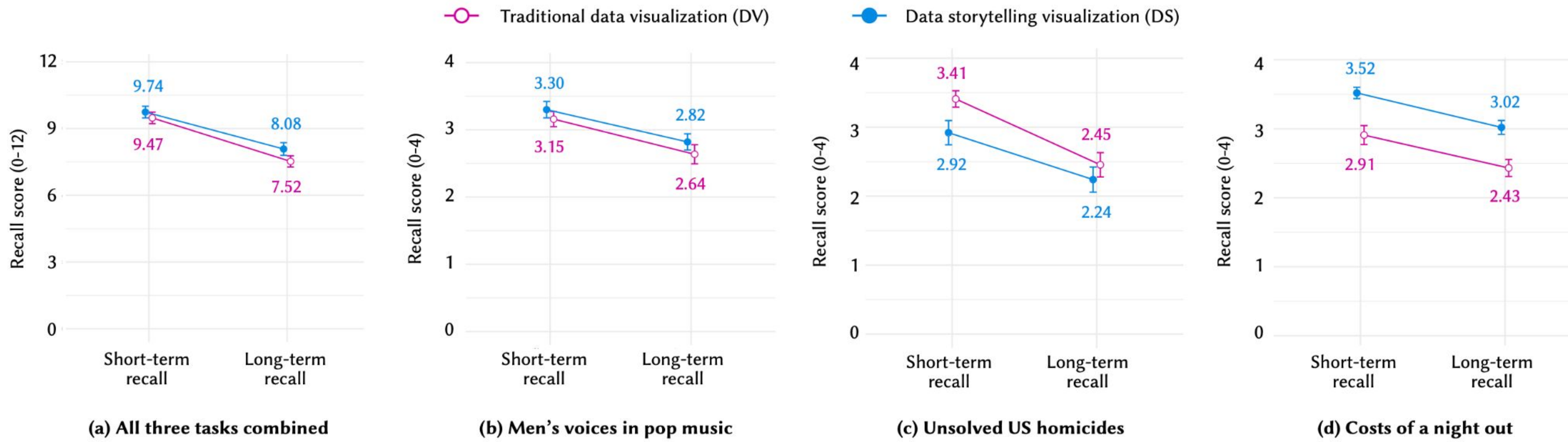

COLAM

Dominyk Zdanovic, Tanja Julie Lembcke, and Toine Bogers. 2022. **The Influence of Data Storytelling on the Ability to Recall Information.** In Proceedings of the 2022 ACM SIGIR Conference on Human Information Interaction and Retrieval (CHIIR '22), March 14–18, 2022, Regensburg, Germany. ACM, New York, NY, USA, 11 pages. https://doi.org/10.1145/3498366.3505755

# Previous and current DS-LA work

**No significant differences in recall** between traditional visualisations and data storytelling visualisation.

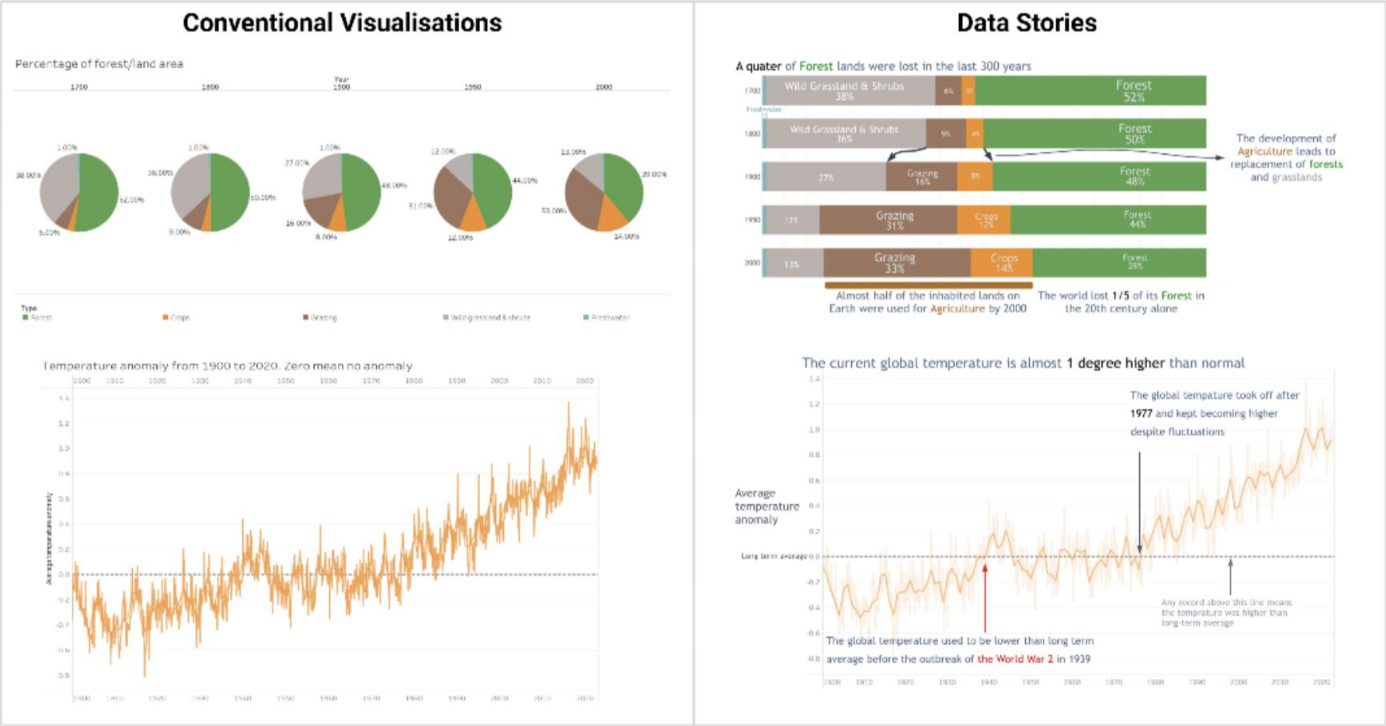
But … the **cognitive load** induced **by different chart types and self-assessed** prior knowledge on the chart topics could **possibly have a moderating effect on information recall**.




COLAM


Dominyk Zdanovic, Tanja Julie Lembcke, and Toine Bogers. 2022. **The Influence of Data Storytelling on the Ability to Recall Information.** In Proceedings of the 2022 ACM SIGIR Conference on Human Information Interaction and Retrieval (CHIIR '22), March 14–18, 2022, Regensburg, Germany. ACM, New York, NY, USA, 11 pages. https://doi.org/10.1145/3498366.3505755

# Previous and current DS-LA work

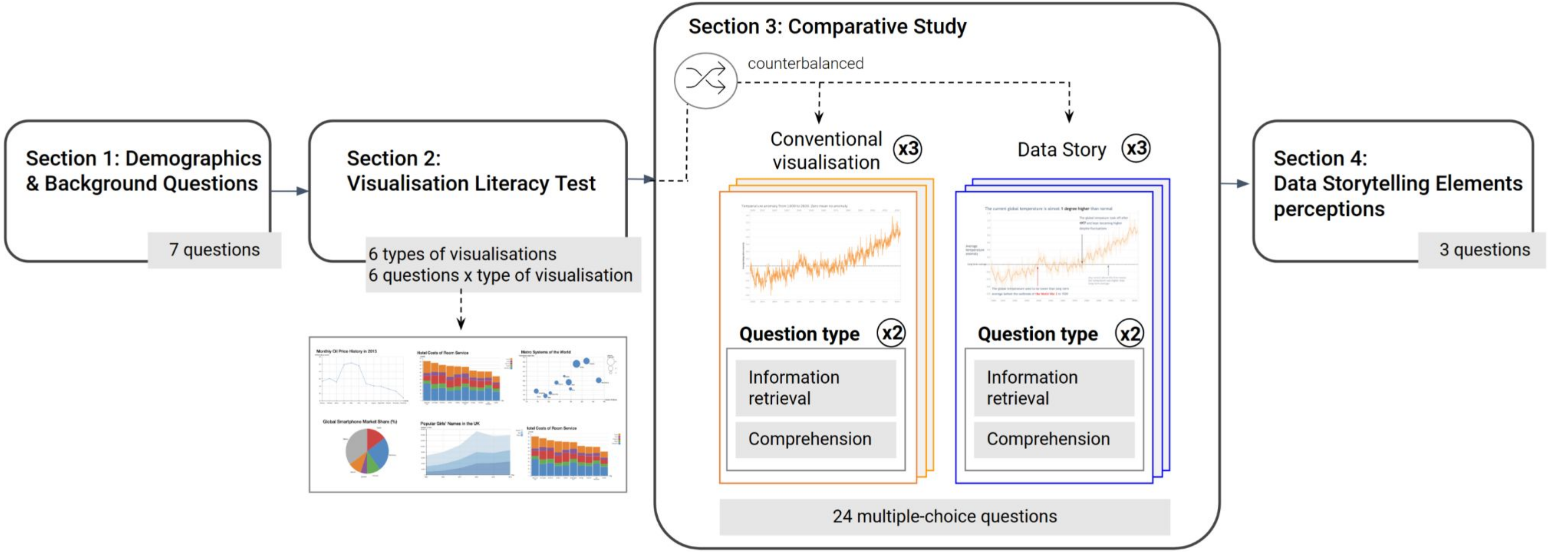



Hongbo Shao

Shao, Echeverria, Gasevic and Martinez-Maldonado. 2024. **Analysing the Efficiency and Effectiveness of Data Storytelling in Supporting Information Retrieval and Comprehension**. Submitted to SIGCHI 24.

# Previous and current DS-LA work

Hongbo Shao



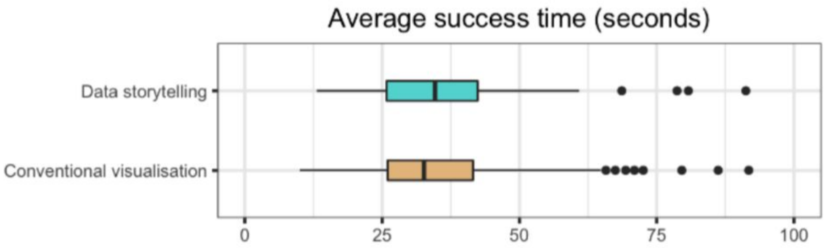



Shao, Echeverria, Gasevic and Martinez-Maldonado. 2024. **Analysing the Efficiency and Effectiveness of Data Storytelling in Supporting Information Retrieval and Comprehension**. Submitted to SIGCHI 24.

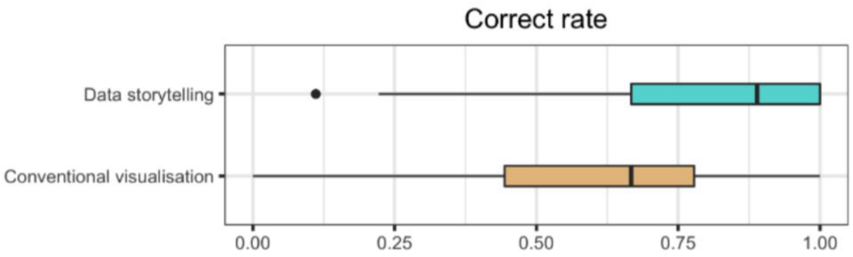
# Previous and current DS-LA work

Hongbo Shao

**Efficiency**
Visualisations **with** Data Storytelling elements **did not** help participants to respond data questions **faster** ….




**Effectiveness**
…but **did** help participants to respond data questions **more accurately** ….




The difference was significant ($p < 0.0001$)

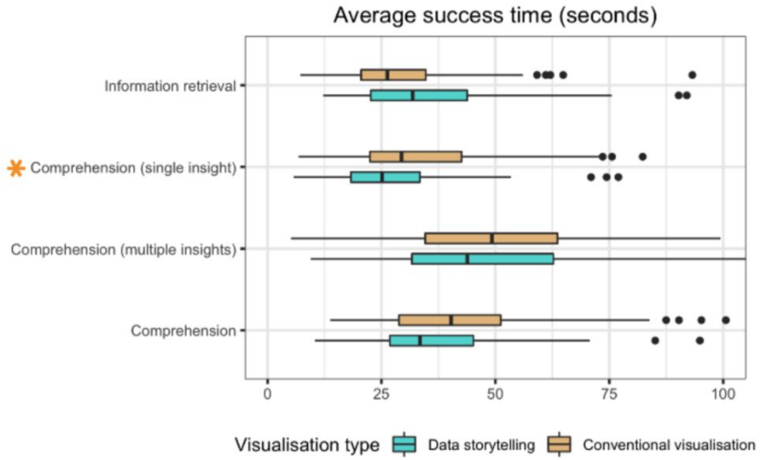
Shao, Echeverria, Gasevic and Martinez-Maldonado. 2024. **Analysing the Efficiency and Effectiveness of Data Storytelling in Supporting Information Retrieval and Comprehension**. Submitted to SIGCHI 24.

# Previous and current DS-LA work

Hongbo Shao

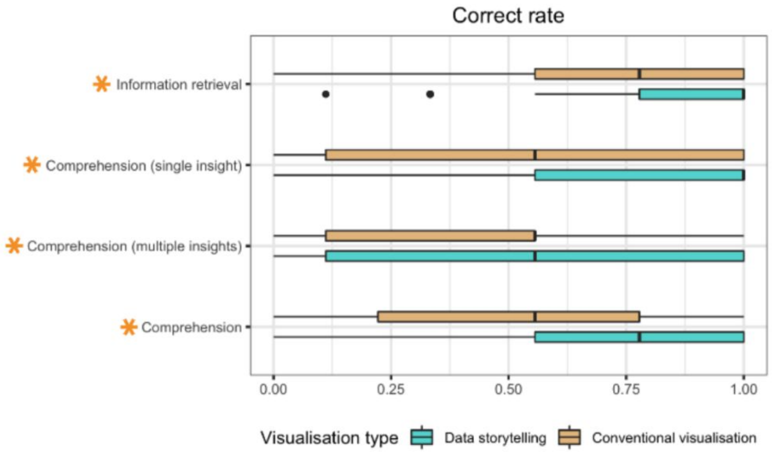
## Efficiency

Visualisations **with** Data Storytelling elements **did actually** help participants to respond **simple comprehension questions faster** ….




## Effectiveness

…and **did** help participants to respond ALL TYPES of questions **more accurately** ….




COLAM

Shao, Echeverria, Gasevic and Martinez-Maldonado. 2024. **Analysing the Efficiency and Effectiveness of Data Storytelling in Supporting Information Retrieval and Comprehension**. Submitted to SIGCHI'24.

# Previous and current DS-LA work

Data Storytelling as part of the **learning design**

COLAM

# Previous and current DS-LA work


Dr Lujie Karen Chen

"**Digital Data Storytelling: is an emerging concept** that integrates the data storytelling process of generating data stories and the creative process of digital storytelling to culminate into data stories presented as **short (1-5 min) videos**"
Example: **Hans Rosling's 4-minute video** that tells the data story of the development trajectory of 200 countries in 200 years (BBC, 2010)

"**The use of Digital Storytelling in STEM education has not been fully exploited**, and there is a lack of educational projects that articulate learning objectives with a reconstructive orientation the process of reconstructing the meaning of a given concept (Wu & Chen, 2020)."

*Qualitative results:*

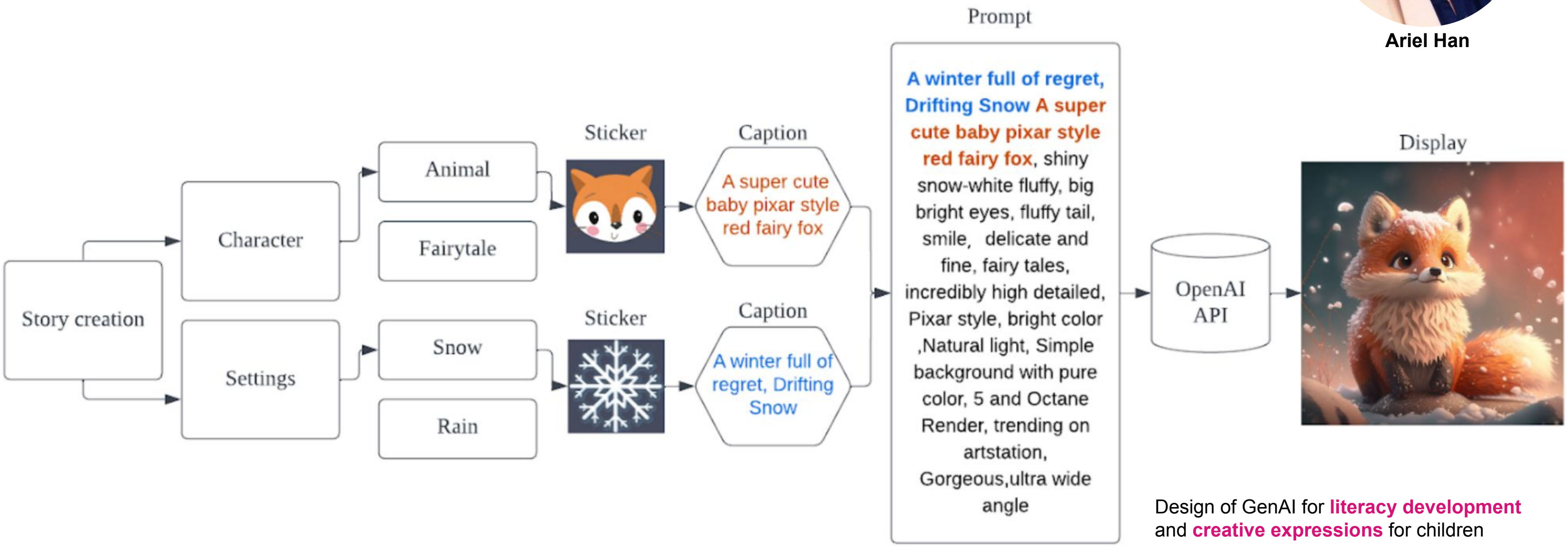
*"...it [DDS] got me to **think about preparing information to share and the best way to articulate it in a way that is easy to understand and descriptive**..."*

COLAM

Lujie Karen Chen, Jamie Gillan, Matthew Decker, Egan Eteffa, Anjelica Marzan, Justin Thai, Sarah Jewett. 2023. **Embedding Digital Data Storytelling in Introductory Data Science Course: An InterInstitutional Transdisciplinary Pilot Study** (Journal of Problem Based Learning in HE.

# Previous and current DS-LA work


Ariel Han




Design of GenAI for **literacy development** and **creative expressions** for children

COLAM

Ariel Han and Zhenyao Cai. 2023. **Design implications of generative AI systems for visual storytelling for young learners. In Interaction Design and Children** (IDC '23), June 19–23, 2023, Chicago, IL, USA. ACM, New York, NY, USA, 5 pages. https://doi.org/10.1145/3585088.3593867

# Presentations

5 minutes presentation + 5 minutes Q&A

MONASH University

COLAM

Centre for Learning Analytics Monash

# Presentations

## GOAL

To learn about **your Data Storytelling approaches** and understand the **challenges** and **opportunities** you have encountered in your DS in LA research.

COLAM

# Presentations

## Data Storytelling for Feedback Analytics

Bhagya Maheshi[*,†], Mikaela Elizabeth Milesi[†], Hiruni Palihena[†], Aaron Zheng[†], Roberto Martinez-Maldonado[†] and Yi-Shan Tsai[†]

*Monash University, Victoria 3800, Australia*

# Presentations

## YarnSense: Automated Data Storytelling for Multimodal Learning Analytics

Gloria Milena Fernández-Nieto[1,*], Vanessa Echeverria[1,3], Roberto Martinez-Maldonado[1] and Simon Buckingham Shum[2]

[1] *Monash University*
[2] *University of Technology Sydney*
[3] *Escuela Superior Politécnica del Litoral, Guayaquil, Ecuador*

COLAM

# Presentations

## Data Storytelling on Multi-modal Knowledge Graph via Data Comics: a case study in Yanyuwa Language

Zhiping Liang[1], Zijie Zeng[1], Gloria Fernandez Nieto[1], Yuheng Li[1], Yi-Shan Tsai[1], Guanliang Chen[1], Zachari Swiecki[1], Dragan Gašević[1], John Bradley[2] and Lele Sha[1,*]

[1] *Center for Learning Analytics at Monash (CoLAM), Monash university*

[2] *Monash Indigenous Studies Centre, Monash university*

COLAM

# Time for coffee ☕

30 minutes

MONASH University

COLAM

Centre for Learning Analytics Monash

# Presentations

5 minutes presentation + 5 minutes Q&A

MONASH University

COLAM

Centre for Learning Analytics Monash

# Presentations

## Use of SHAP values for identifying differences in behaviors for subpopulations under intervention

Juan A. Talamás-Carvajal[b], Hector G. Ceballos-Cancino[b]

*a Tecnologico de Monterrey, School of Engineering and Science, Av. Eugenio Garza Sada 2501 Sur, Tecnológico, 64849 Monterrey, N.L, Mexico*
*b Tecnologico de Monterrey Institute for the Future of Education, Av. Eugenio Garza Sada 2501 Sur, Tecnológico, 64849 Monterrey, N.L, Mexico*

COLAM

# Presentations

## Automating Data Narratives in Learning Analytics Dashboards using GenAI

Adriano Pinargote[1,*], Eddy Calderón[1], Kevin Cevallos[1], Gladys Carrillo[1], Katherine Chiluiza[1] and Vanessa Echeverria[1,2]

*[1] Escuela Superior Politecnica del Litoral , (Information Technology Center), Campus Gustavo Galindo Km. 30.5 Vía Perimetral, P.O. Box 09-01-5863, Guayaquil, Ecuador*
*[2] Monash University, Clayton, VIC, Australia*

COLAM

# Presentations

## From Visualizing to Narrativizing: Powerful Data Storytelling through Non-Player Characters

Maurice A. Boothe Jr.[1], Jeffrey S. Brenneman[1]

[1] *New York University*

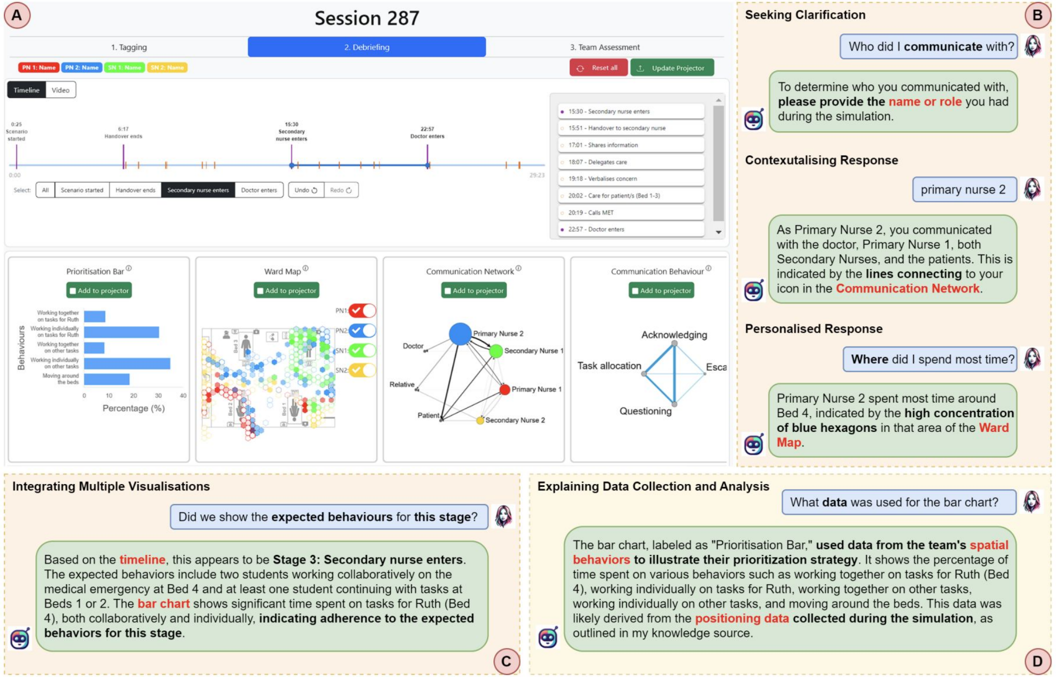
COLAM

# Future DS-LA work

COLAM

# Future DS-LA work: Generative AI

LAD with 4 visualisations




VisChat clarifies queries, contextualises responses.

Integrates multiple visualisations for explanations.

Explains data analysis and collection methods.

COLAM

**VizChat: Enhancing Learning Analytics Dashboards with Contextualised Explanations using Multimodal Generative AI Chatbots**. - AIED 2024 accepted

Yan, Zhao, Echeverria, Jin, Alfredo, Li, Gasevic and Martinez-Maldonado

# Future DS-LA work

When building data stories takes time and effort, some **people may wonder whether AI tools can be used to automate data storytelling.**

… four main reasons why data storytelling can't or shouldn't be fully automated.

1. **Oversimplification of what data storytelling is**
2. **Storytelling is a uniquely human skill**
3. **Transparency and trust are essential to adoption**
4. **Not everything that can be automated should be**

COLAM

Brent Dykes. [Forbes link]

Forbes

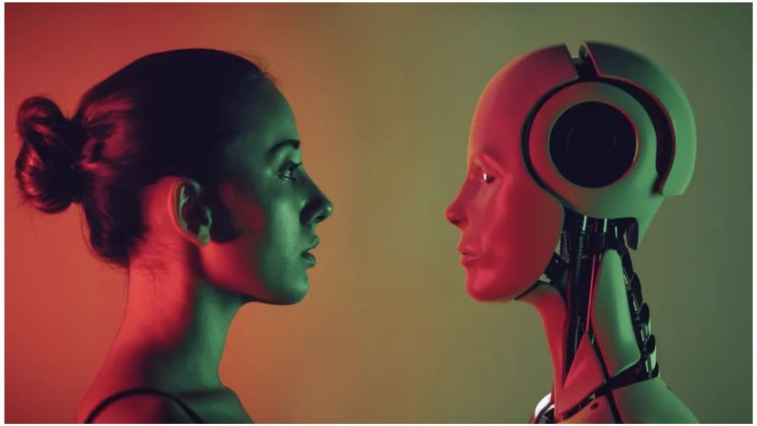
## The Future Of Data Storytelling Is Augmented, Not Automated

**Brent Dykes** Contributor

*I write about how to drive more value with data and analytics.*

Follow

Feb 27, 2024, 12:23pm EST



While many are looking at AI automating data storytelling, it's better to view it from how AI and ... [+] ISTOCK | IMAGINIMA

As evidenced by the Palawa oral traditions of the Tasmanian

# Future DS-LA work

With the emergence of AI, we now have a **potential partner that can augment how we find and tell stories with data**. Even though human beings have been developing their storytelling skills over thousands of years, the rapid pace of AI innovation means **we may achieve more with less effort**. Data storytelling is a responsibility we shouldn't mind sharing but also one that humans should never surrender—it's engrained in our DNA and essential to our success.

Forbes

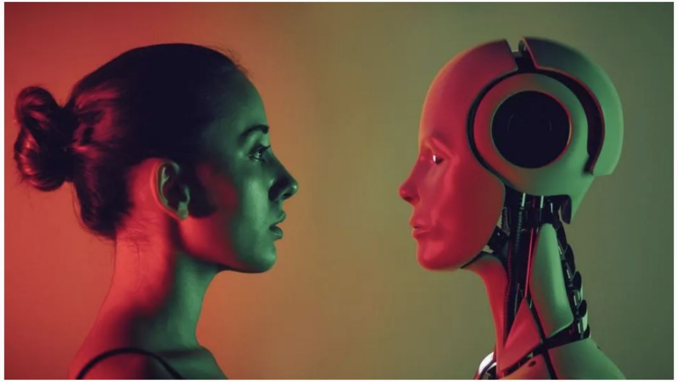
## The Future Of Data Storytelling Is Augmented, Not Automated

**Brent Dykes** Contributor

*I write about how to drive more value with data and analytics.*

Follow

Feb 27, 2024, 12:23pm EST



While many are looking at AI automating data storytelling, it's better to view it from how AI and ... [+] ISTOCK | IMAGINIMA

As evidenced by the Palawa oral traditions of the Tasmanian

Brent Dykes. [Forbes link]

# Future DS-LA work

## Discovering insights

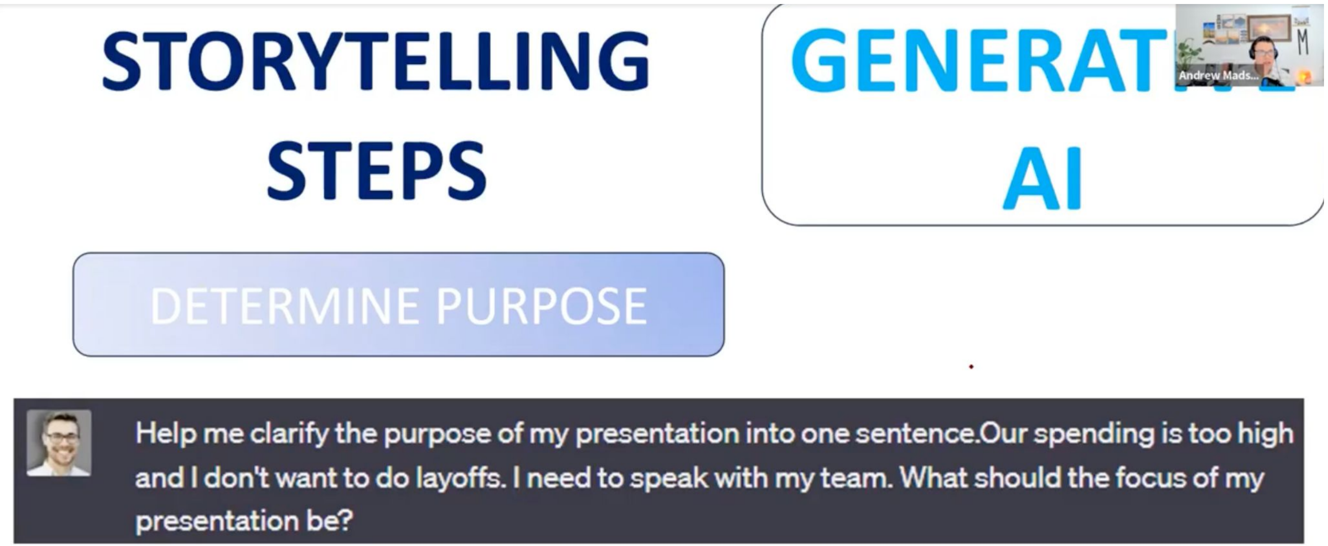
### Data Storytelling Comparison: Humans vs. AI

| | Humans only | AI only | Humans + AI (Augmented) |
|---|---|---|---|
| Data preparation | Time-consuming and error prone as data volumes increase.<br>**Strength:** ■■□□□ | Highly efficient and accurate with rule-based approach.<br>**Strength:** ■■■■■ | **Humans** identify relevant data sources and frame the right questions.<br>**AI** automates cleaning, merging and structuring data for analysis. |
| Basic data analysis | Aided by software tools to perform simple calculations and make observations. Harder with larger datasets.<br>**Strength:** ■■□□□ | Highly efficient at performing simple calculations and analyzing larger datasets.<br>**Strength:** ■■■■■ | **AI** performs initial analyses.<br>**Humans** interpret the results, identifying meaningful anomalies, trends and patterns. |
| Advanced data analysis | Requires time, advanced skills and analytics tools. Must understand the business context to find actionable insights.<br>**Strength:** ■■□□□ | Spots anomalies, patterns, and trends in complex datasets. Lacks contextual understanding to frame their significance for the business.<br>**Strength:** ■■■■□ | **AI** analyzes and models complex relationships.<br>**Humans** apply domain knowledge to refine interpretations, models and hypotheses. |
| Data visualization | Requires some data visualization and design skills. Must understand best practices for explanatory charts.<br>**Strength:** ■■■□□ | Relies on pre-defined criteria to determine suitable data visualizations. May not identify the right chart and design for a particular data scene.<br>**Strength:** ■■■□□ | **AI** suggests optimal visualization types and approaches.<br>**Humans** customize the charts for clarity, context and visual impact. |
| Narrative creation | Skilled at connecting the dots in the data and using storytelling techniques to build stories. Use innate creativity, empathy and contextual understanding.<br>**Strength:** ■■■■■ | Summarizes findings but lacks empathy and contextual understanding to build meaningful narrative.<br>**Strength:** ■■□□□ | **Humans** craft a compelling story.<br>**AI** offers or suggests enhancements to further enrich the narrative. |
| Audience alignment | Able to empathize and understand various audiences so content resonates more strongly.<br>**Strength:** ■■■■■ | Difficult to tailor content to different audiences without knowing their needs and interests. Empathy and customization are weaknesses.<br>**Strength:** ■■□□□ | **Humans** understand the intended audience's interests and needs.<br>**AI** helps personalize the content delivery based on audience profiles. |

Brent Dykes. [Forbes link]

# Future DS-LA work

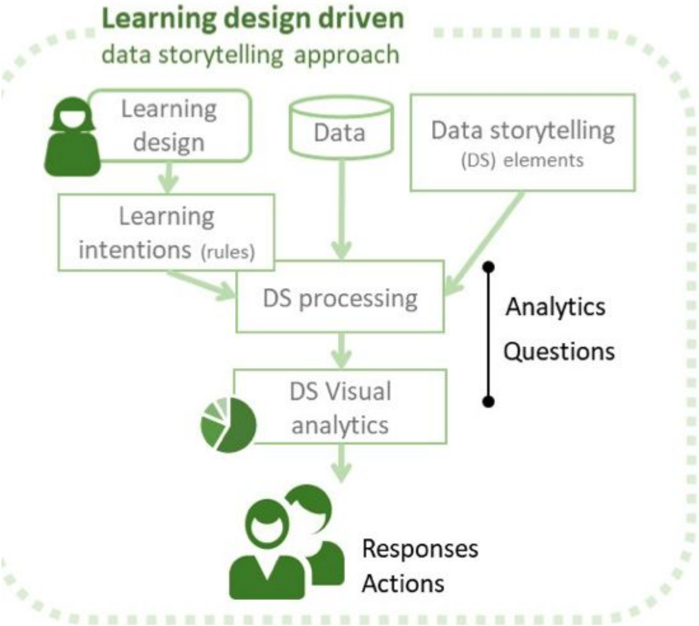
**Communicate insights**






Andrew Madson: https://www.linkedin.com/events/7092594382192730112/comments/

# Reflecting the present




How do you position your work in current DS approaches?
What tools, techniques, solutions can be used on each component?
What are the advantages and disadvantages?
What are the benefits and drawbacks of current tools, techniques, solutions?

COLAM

# Group activity

Let's work in groups - 45 mins

MONASH University

COLAM

Centre for Learning Analytics Monash

# Thinking about the future

What aspects should we focus, as a research group, in future work?

- Generate/ discover  insights
- Communicate insights

COLAM

# Thinking about the future

What aspects should we focus, as a research group, in future work?

When discussing on these, consider the following aspects:

- **Human-centredness:** How can we include stakeholders perspectives in these solutions? What is a good story from the LA perspective?
- **Technology:** Are we there yet? What is needed to improve/automate the process of including DS into our LA solutions?
- **FATE:** Does our LAD solution adhere to best practices on fairness, accountability, transparency and ethics? Does our LAD solution mitigate bias? Are stories fair?
- **Impact on teaching and learning:** What considerations are needed to measure impact of our LAD solutions? How can we measure this impact? Can we use DS-LA to assess teaching/learning?

https://bit.ly/DS-LAK-future-ideas

bitly

COLAM

# Final discussion

15 min

MONASH University

COLAM
Centre for Learning Analytics Monash

Previous LA work

- LAK paper -> Mikaela Yi-Shan data comics, Gloria, Jimmie [done]
- Echeverria DS elements / Explanatory visualisations [done]
- Maldonado layer approach [done]
- Chen
- Fernandez [done]
- Pozdniakov [done]
- **Karen** [search]
- Not just dashboards -> script for communication, co-design [storyboard] -> engage of students to co-create LA interfaces, to create teaching content for young learners [link].
- Storytelling - Generative AI: opportunities of using GenAI to create stories

# Previous work

Storytelling for educational purposes
Storytelling for explanatory purposes

Storytelling to design for educational purposes

# Motivations and foundations

## STORYTELLING AS THE OLDEST FORM OF EDUCATION

Source: The wall street journal

Humans have always told stories to pass down cultural beliefs, traditions, and history to future generations.

It's our way of learning and sharing information with each other. In that way, it's the oldest form of education we have.

# Motivations and foundations

## STORYTELLING AS AN EFFECTIVE FORM OF EDUCATION


Fukushima J. Med. Sci.,
Vol. 64, No. 3, 2018

[Original Article]

**Effects of storytelling on the childhood brain : near-infrared spectroscopic comparison with the effects of picture-book reading**

Miyuki Yabe[1,2,4], Sachie Oshima[1], Satoshi Eifuku[2], Masato Taira[3], Kazuto Kobayashi[4], Hirooki Yabe[1] and Sin-ichi Niwa[1]

*[1]Department of Neuropsychiatry, Fukushima Medical University, Fukushima, Japan, [2]Department of Systems Neuroscience, Fukushima Medical University, Fukushima, Japan, [3]Department of Cognitive Neurobiology, Tokyo Medical and Dental University, Tokyo, Japan, [4]Department of Molecular Genetics, Institute of Biomedical Sciences, Fukushima Medical University, Fukushima, Japan*

(Received April 25, 2018, accepted September 21, 2018)

**Abstract**
In children, storytelling provides many psychological and educational benefits, such as enhanced imagination to help visualize spoken words, improved vocabulary, and more refined communication skills. However, the brain mechanisms underlying the effects of storytelling on children are not clear. In this study, the effects of storytelling on the brains of children were assessed by using near-infrared spectroscopy (NIRS). Results indicated significant decreases of the blood flow in the bilateral prefrontal areas during picture-book reading when the subjects were familiarized in comparison to the cases of the subject naïve to the stories. However, no significant differences in the blood flow were found during storytelling between the subjects naïve and familiarized to the stories. The results indicated more sustained brain activation to storytelling in comparison with picture-book reading, suggesting possible advantages of storytelling as a psychological and educational medium in children.

**Key words :** Storytelling, Picture-book reading, Children, NIRS

"The results indicated more sustained brain activation to storytelling in comparison with picture-book reading"

"In agreement with the previous clinical claims discussed above, our results may support usefulness of storytelling in education."

Yabe, Miyuki, et al. "Effects of storytelling on the childhood brain: near-infrared spectroscopic comparison with the effects of picture-book reading." Fukushima journal of medical science 64.3 (2018): 125-132.

# Motivations and foundations

LADs can be difficult to understand by non-data experts
LADs may be not as effective in communicating insights
LADs failed to align with teachers pedagogical intentions
People are familiar with stories, communicating teaching and learning outcomes using data stories is an opportunity for LA field.
DS provide computer-assisted guidance to support casual users, or users with less experience in data analysis, to interpret data visualisations.
Stories emerged from the analysis of data and can be presented by emphysing relevant data points in a way that non-experts are supported to interpret such data.

COLAM

# Motivations and foundations

How do we kickstart the **Data Storytelling process**?

https://gramener.com/storylabs-publications/defining-data-storytelling

# Motivations and foundations

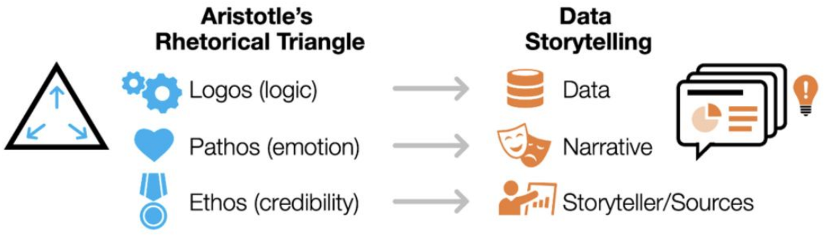
- Guidance can be implementing in visualisations via: 1) visual cues (colour highlights, shapes, annotations). 2) providing different visualisations techniques, 3) or via data storytelling.

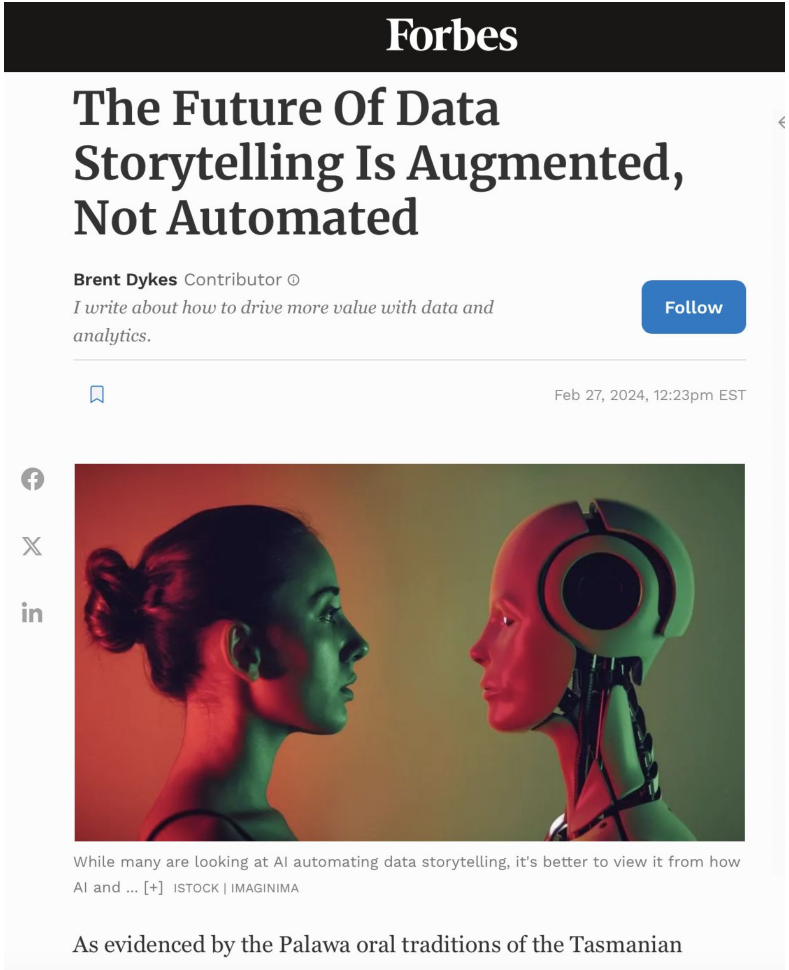
DS uses prominent visual features:

- Colour
- Shape
- Capture attention
- Guide interpretation of key information
- Minimise visual clutter to prevent cognitive overload
- Include textual narrative (explain data points, emphasize important sections of the visualisation)

# Future DS-LA work

3. Transparency and trust are essential to adoption





Forbes

The Future Of Data Storytelling Is Augmented, Not Automated

Brent Dykes Contributor

*I write about how to drive more value with data and analytics.*

Follow

Feb 27, 2024, 12:23pm EST

While many are looking at AI automating data storytelling, it's better to view it from how AI and ... [+] ISTOCK | IMAGINIMA

As evidenced by the Palawa oral traditions of the Tasmanian

COLAM

Brent Dykes. [Forbes link]